



# Local Drought Management Planning Guide

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# The focus of this presentation is to provide CWSs with a guide for developing a good Local Drought Management Plan

It fits into the State's Drought Management Plan.

# Drought Management Plan

## Drought Responses

Program Phase and Conditions	State and Federal Actions	Local Actions		
		Public Water Suppliers	Industrial	Agricultural and Self-Supplied
<b>Normal Conditions</b>				
<ul style="list-style-type: none"> <li>Water supply is adequate, water quality is acceptable under normal management</li> </ul>	<ul style="list-style-type: none"> <li>Develop production, streamflow, ground-water and water quality monitoring programs</li> <li>Conduct state and regional water studies and conduct water conservation studies</li> <li>Assess public water supplies and local government in developing Emergency Water Management Plans (EWMPs)</li> <li>Establish public education programs</li> </ul>	<ul style="list-style-type: none"> <li>Develop Emergency Water Management Plans</li> <li>Develop additional storage and treatment facilities, wastewater distribution system</li> <li>Adopt curfew rules, water conservation measures and codes and establish mutual aid agreements, interconnections, contracts or other arrangements</li> </ul>	<ul style="list-style-type: none"> <li>Develop Emergency Water Management Plans</li> <li>Develop additional wastewater storage</li> <li>Develop alternative water supplies, water storage and conservation measures</li> <li>Purchase standby equipment and install permanent equipment as necessary for providing</li> </ul>	<ul style="list-style-type: none"> <li>Develop county emergency management plans</li> <li>Evaluate need for irrigation</li> <li>Enlarge ponds, purchase barrels, etc. and establish constructed wetlands and livestock water tanks</li> <li>Evaluate agricultural water use and find water conservation opportunities, including use of "bait" irrigation</li> <li>Establish alternative water use and control water delivery diversions, etc. to reduce stress on supply sources</li> </ul>
<b>Drought Alert</b>				
<ul style="list-style-type: none"> <li>Lower than normal precipitation, declining streamflow and lower groundwater levels, groundwater storage depleted</li> </ul>	<ul style="list-style-type: none"> <li>Declare water drought alert to public and establish a public water supply (PWS) may be declared or total</li> <li>Initiate voluntary water conservation measures</li> <li>State Emergency Management Program</li> </ul>	<ul style="list-style-type: none"> <li>Monitor water sources and daily water use for specific purposes and implement water conservation</li> </ul>	<ul style="list-style-type: none"> <li>Monitor water sources and daily water use for specific purposes and implement water conservation</li> </ul>	<ul style="list-style-type: none"> <li>Monitor water sources and daily water use for specific purposes and implement water conservation</li> </ul>
<b>Voluntary Reductions</b>				
<ul style="list-style-type: none"> <li>Water supply and water quality deteriorating or critical storage levels</li> </ul>	<ul style="list-style-type: none"> <li>Declare state water supply and water quality alert</li> <li>Monitor systems and water quality and public information</li> <li>Coordinate state and federal supply and water quality efforts</li> <li>Respond to state and federal requests for assistance</li> <li>Post stream water quality quality and quantity</li> <li>Overlook water quality and water quality</li> </ul>	<ul style="list-style-type: none"> <li>Implement "Voluntary Reductions" phase of plan (agreements, restrictions, etc.)</li> <li>Implement "Voluntary Reductions" phase of plan (agreements, restrictions, etc.)</li> <li>Implement "Voluntary Reductions" phase of plan (agreements, restrictions, etc.)</li> <li>Implement "Voluntary Reductions" phase of plan (agreements, restrictions, etc.)</li> </ul>	<ul style="list-style-type: none"> <li>Implement "Voluntary Reductions" phase of plan (agreements, restrictions, etc.)</li> <li>Implement "Voluntary Reductions" phase of plan (agreements, restrictions, etc.)</li> <li>Implement "Voluntary Reductions" phase of plan (agreements, restrictions, etc.)</li> <li>Implement "Voluntary Reductions" phase of plan (agreements, restrictions, etc.)</li> </ul>	<ul style="list-style-type: none"> <li>Implement "Voluntary Reductions" phase of plan (agreements, restrictions, etc.)</li> <li>Implement "Voluntary Reductions" phase of plan (agreements, restrictions, etc.)</li> <li>Implement "Voluntary Reductions" phase of plan (agreements, restrictions, etc.)</li> <li>Implement "Voluntary Reductions" phase of plan (agreements, restrictions, etc.)</li> </ul>
<b>Mandatory Restrictions</b>				
<ul style="list-style-type: none"> <li>Continued decline in water supply and/or water quality</li> </ul>	<ul style="list-style-type: none"> <li>Declare state water supply and water quality alert</li> <li>Monitor systems and water quality and public information</li> <li>Coordinate state and federal supply and water quality efforts</li> <li>Respond to state and federal requests for assistance</li> <li>Post stream water quality quality and quantity</li> <li>Overlook water quality and water quality</li> </ul>	<ul style="list-style-type: none"> <li>Implement "Mandatory Restrictions" phase of plan (agreements, restrictions, etc.)</li> <li>Implement "Mandatory Restrictions" phase of plan (agreements, restrictions, etc.)</li> <li>Implement "Mandatory Restrictions" phase of plan (agreements, restrictions, etc.)</li> <li>Implement "Mandatory Restrictions" phase of plan (agreements, restrictions, etc.)</li> </ul>	<ul style="list-style-type: none"> <li>Implement "Mandatory Restrictions" phase of plan (agreements, restrictions, etc.)</li> <li>Implement "Mandatory Restrictions" phase of plan (agreements, restrictions, etc.)</li> <li>Implement "Mandatory Restrictions" phase of plan (agreements, restrictions, etc.)</li> <li>Implement "Mandatory Restrictions" phase of plan (agreements, restrictions, etc.)</li> </ul>	<ul style="list-style-type: none"> <li>Implement "Mandatory Restrictions" phase of plan (agreements, restrictions, etc.)</li> <li>Implement "Mandatory Restrictions" phase of plan (agreements, restrictions, etc.)</li> <li>Implement "Mandatory Restrictions" phase of plan (agreements, restrictions, etc.)</li> <li>Implement "Mandatory Restrictions" phase of plan (agreements, restrictions, etc.)</li> </ul>
<b>Emergency Management</b>				
<ul style="list-style-type: none"> <li>Severe water supply and/or water quality problems due to very limited resources availability</li> </ul>	<ul style="list-style-type: none"> <li>Declare state water supply and water quality alert</li> <li>Monitor systems and water quality and public information</li> <li>Coordinate state and federal supply and water quality efforts</li> <li>Respond to state and federal requests for assistance</li> <li>Post stream water quality quality and quantity</li> <li>Overlook water quality and water quality</li> </ul>	<ul style="list-style-type: none"> <li>Implement "Emergency Management" phase of plan (agreements, restrictions, etc.)</li> <li>Implement "Emergency Management" phase of plan (agreements, restrictions, etc.)</li> <li>Implement "Emergency Management" phase of plan (agreements, restrictions, etc.)</li> <li>Implement "Emergency Management" phase of plan (agreements, restrictions, etc.)</li> </ul>	<ul style="list-style-type: none"> <li>Implement "Emergency Management" phase of plan (agreements, restrictions, etc.)</li> <li>Implement "Emergency Management" phase of plan (agreements, restrictions, etc.)</li> <li>Implement "Emergency Management" phase of plan (agreements, restrictions, etc.)</li> <li>Implement "Emergency Management" phase of plan (agreements, restrictions, etc.)</li> </ul>	<ul style="list-style-type: none"> <li>Implement "Emergency Management" phase of plan (agreements, restrictions, etc.)</li> <li>Implement "Emergency Management" phase of plan (agreements, restrictions, etc.)</li> <li>Implement "Emergency Management" phase of plan (agreements, restrictions, etc.)</li> <li>Implement "Emergency Management" phase of plan (agreements, restrictions, etc.)</li> </ul>

What do CWSs need  
**most to do?**

What would they **most**  
like to **avoid?**

In other words,  
“What can go wrong for a water  
system?”

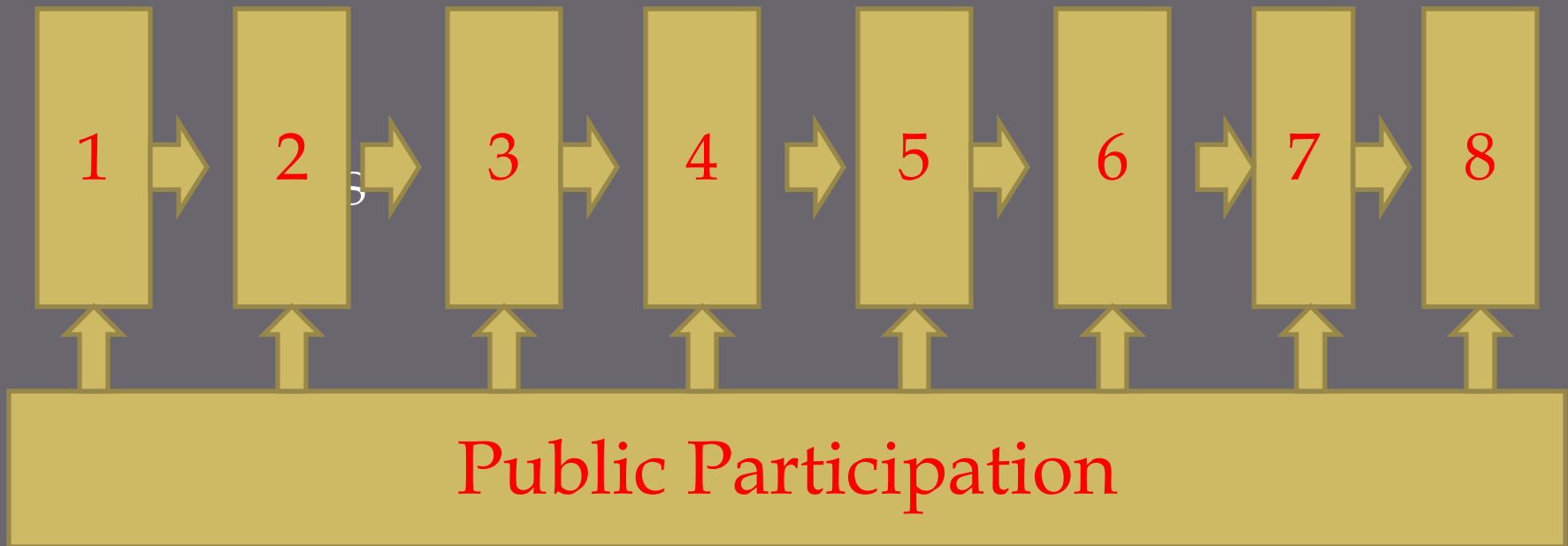
# Rules **Currently** Require CWSs

- ▣ To have an approved EOP (Emergency Operation Plan). An EOP must address drought .
- ▣ In addition, CWSs must have 24 hours storage
- ▣ Plan for expansion if they exceed 80% of capacity

# A Drought Management Plan Can Help A CWS:

- ▣ Minimize adverse affects
- ▣ Make the best use of available water
- ▣ Allow for predictability and equitability
- ▣ Provide a basis for management decisions (why and when things are done)

# 8 Steps in Developing a Management Plan



Public input may need to be included in several steps, not just plan adoption.

# Step 1 - Preplanning

- ▣ Authority and Status to Plan.
- ▣ Risks and Purpose of the Drought Management Plan.
- ▣ Drought Management Plan within the Context of an EOP.





# Step 2 - Organizing the Process

- ▣ Create a Planning Committee, Task Force, Individual or Other Group.
- ▣ Delineate a Planning Process (Comprehensive, Fair, Orderly, Reasonable, Functional).
- ▣ Consider Public Involvement - Public Review.
- ▣ Identification of Goals and Priorities

Health (Medical, Nursing Homes, Sanitation).

Safety (Fire Protection).

Environment (Erosion, Aquatic Habitat).

Economic (Industry Process, Cooling , Business).

Recreation (Pools, Athletic Fields, Golf Courses).

Sanitation (20 psi throughout distribution system).

# Step 3 - Identify Existing Plans, Partnerships, Policies & Procedures

Existing Emergency Operations Plans and  
Drought Management Plans.

Interconnections, Mutual Aid Agreements  
and Backup Sources.

Ordinances, Policies, Legal Requirements.

# Step 4 - Coordinate with State and Regional Agencies

- ▣ **Identify Regional Stakeholders.**
  - TVA, Corps of Engineers, NPS, other CWSs, Development Districts, Regional Authorities
- ▣ **Clarify and Resolve Conflicts.**
  - ▣ Municipal waste water discharges (NPDES)
  - ▣ Industrial waste water discharges
  - ▣ Critical environmental habitats
  - ▣ Stream Classifications and ARAP requirements
  - ▣ Reservoir Operation Guides

# Step 5 - Plan the Management Phases

- ▣ Use Risks
- ▣ Source Risks and “Triggerpoints”

Reservoir (Major River and Tributary).

Run-of-River (First Order and Lower Order Streams).

Groundwater (wells and springs).

Public Water System (Purchase Systems - Cascading Declines).

Ponds, Cisterns and Other Sources.

Complaints (Pressure, Out-of-Water, etc.)

Forestry – Fire Hazard.

Soil Moisture.

- ▣ Phased Management

# PWSs Must Consider Their Goals in Developing Management Phases

- ▣ Normal
- ▣ Alert
- ▣ Voluntary Reductions
- ▣ Mandatory Restrictions
- ▣ Emergency Management



# CWSs Must Assess Water Use Demands

## ▣ Base Demands

- Domestic Residential, Nursing Homes
- Hospitals
- Commercial
- Industrial

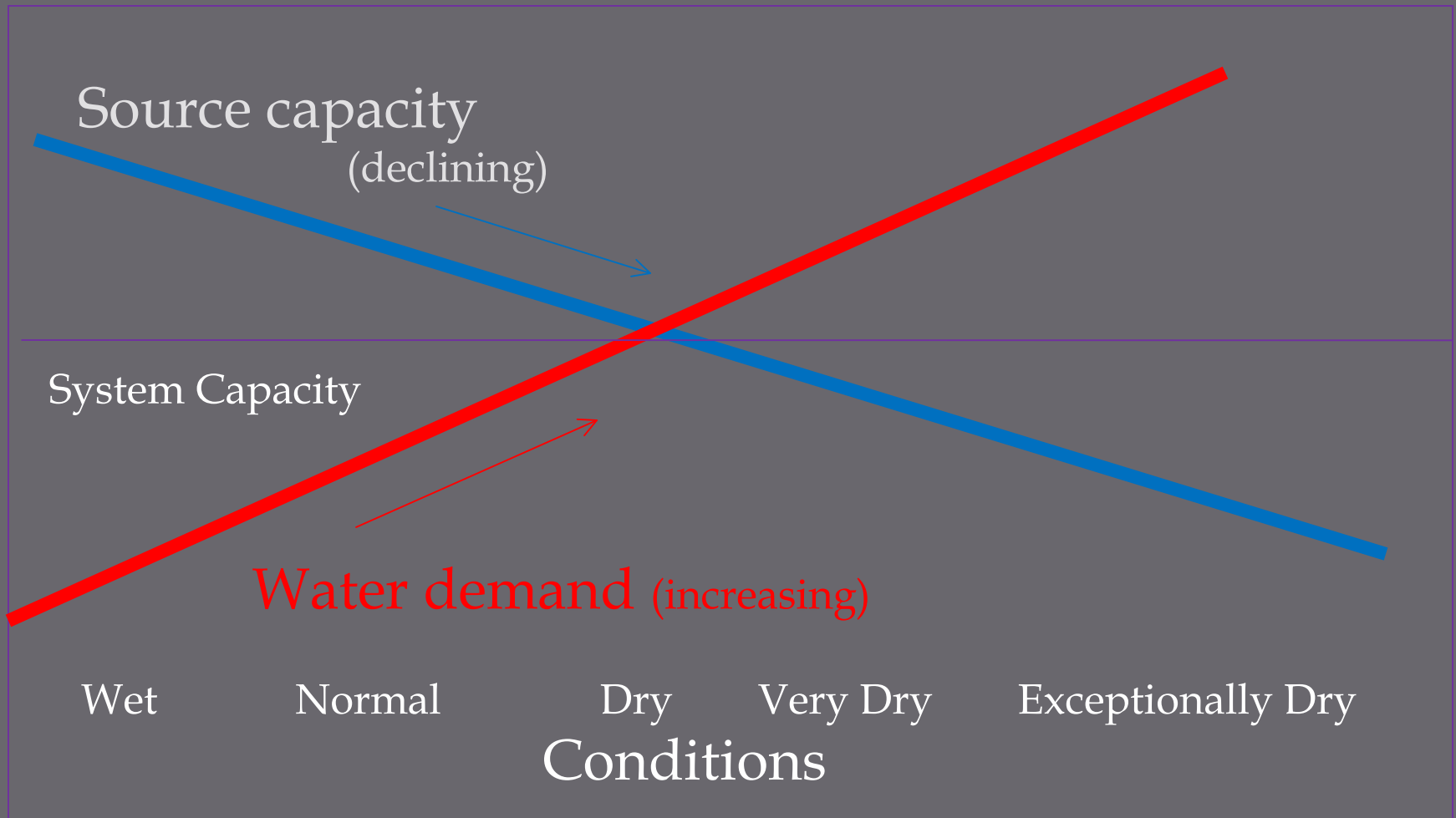
## ▣ Seasonal Demands

- Lawn Watering
- Golf Course Irrigation
- Swimming Pool
- Agriculture (Truck crops, Livestock, Dairy – due to normal sources drying up)

# CWSs Must Consider Source-Related Risks

- ▣ Source Capacity
- ▣ Diversity of Sources (Surface, Spring, Well, PWSs and Cascading Declines)
- ▣ Hydraulic capacity (treatment capacity, pumping and transmission capacity, storage capacity)
- ▣ Vulnerability to other risks (spills, etc.)
- ▣ Emergency Management Provisions In-Place

# Water Systems Must Balance Supply and Demand





# Potential Water Quality Problems Related To Drought

- Algal blooms – Resulting in Taste and Odor problems and additional treatment
- Temperature – Resulting in Chlorine Dissipation
- Waste Assimilation - Inability of sources to assimilate making treatment more difficult

# Potential Trigger-Points

- ▣ Water in storage
- ▣ Inadequate water pressure
- ▣ Level of demand, especially peak demand
- ▣ Declining source capacity (including purchased water sources)
- ▣ Water quality complaints

(Systems will have more than one.)

# Define Use Classes

## Essential 1<sup>st</sup> Uses

- ▣ Domestic Drinking Water
- ▣ Hospital and other health care facilities
- ▣ Nursing Homes
- ▣ Sanitation
- ▣ Fire Fighting
- ▣ Pet Drinking Water



# Non-Essential Water Uses

- ▣ Lawn watering
- ▣ Car Washing (Non-Commercial)
- ▣ Vehicle Washing Facilities (Non-Recycling)
- ▣ Driveway, Sidewalk and Patio Washing
- ▣ Golf Courses (Fairways)
- ▣ Fountains



# Restrictions in Time of Day

## where there are hydraulic issues

- ▣ Golf Courses (allow watering of greens between 8 pm and 6 am)
- ▣ Garden Watering (allow between 8 pm and 6 am)
- ▣ Watering of athletic fields, trees and shrubs to sustain plant material (allow between 8 pm and 6 am)
- ▣ Filling or refilling of swimming pools (allow between 8 pm and 6 am)
- ▣ Commercial vehicle washing facilities (allow between 8 pm and 6 am)

# Rationing and Pricing

- ▣ Based on a per capita amount (registration)
- ▣ A percent of the previous year's usage (can be a software issue)
- ▣ Alternative rate structures (can be a software issue)
- ▣ Based on a percent of a previous average month's use

(Consider other tools for reducing water use, not just use restrictions uses. Livestock do not need potable water. Work with agricultural community.)

# Restricted Water Uses

Normal and Alert				
Voluntary Reductions				
Mandatory Restrictions				
Emergency				

- ▣ Evaluate the water demand of targeted uses to meet reduction goals.

# Step 6 - Plan for Implementation Activities

- ▣ Monitoring Supply (Sources, Hydraulic, etc)
- ▣ Monitoring Demand (Seasonal, Daily, Use)
- ▣ Balancing Supply and Demand
- ▣ Water Quality (Complaints, T&O)
- ▣ Trigger-points and Phases
- ▣ Public Notice – Plan and Phase Activation
- ▣ Compliance and Enforcement (Warnings, Shut-offs, etc.)
- ▣ Resources – Staff, vehicles, mail-outs, etc.

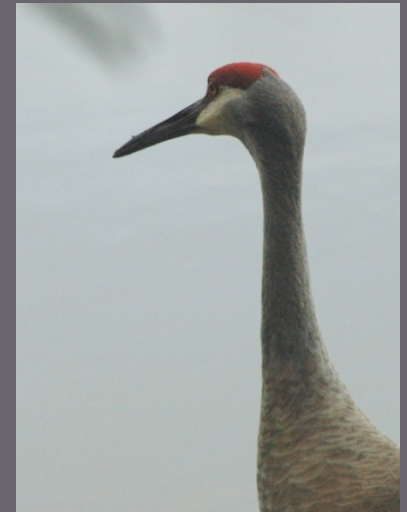


# Assess Management Phases

- ▣ Available Staff and Equipment (to monitor restrictions, read meters, etc.)
- ▣ Standby or Alternative Rate Structures and/or Rationing Schemes have been established
- ▣ Ordinances and By-laws (are in place)
- ▣ Plan is socially acceptable (Non-Essential Uses are not classified as Essential uses)
- ▣ Announcement system in place (notification)

# Step 7 – Identify Management Team

- ▣ Establish Management Team - Purpose, Structure, Roles and Functions
- ▣ Membership, Reporting to Who
- ▣ Decision-making
- ▣ Public Notification/Education
- ▣ Monitoring (Supply and Demand)
- ▣ Coordination/Communication
- ▣ Enforcement
- ▣ Records and Documentation
- ▣ Deactivation



# Summary of Planning Steps

- Pre-planning – Authority to plan
- Task Force or Group – Establish Process , Goals and Public Involvement
- Recognize Existing Plans, Partnerships, Agreements
- Coordinate with and Notify State and Regional Agencies
- Identify Source Risks, Water Demand, Trigger-points and Plan Phased Responses
- Plan for Implementation – Monitoring, Activation of Phases, Staff and Resources Needed, Public Notification and Enforcement
- Management Team (Responsibilities)
- Review, Evaluate, Up-date and Adopt Plan

# QUESTIONS? & Comments



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